CHAPTER 1

# Global Imbalances

Over the past decades, the world has witnessed the emergence of large external debt positions in some countries and large external asset positions in others. The United States became the largest external debtor in the world in the late 1980s and has maintained this position ever since. At the same time, China, Japan, and Germany hold large asset positions against the rest of the world. This phenomenon has come to be known as *global imbalances.*

The *heat map* in Figure 1.1 presents the accumulated current account balances from 1980 to 2017 for 182 countries. As we will explain in more detail later in this chapter, to a first approximation the current account equals the change in a country's net foreign asset position. Current account surpluses increase a country's net foreign asset position and current account deficits decrease it. By accumulating the current account balances of each country over time, we can obtain an idea of which countries have been playing the role of lenders and which the role of borrowers. Cumulative current account surpluses appear in green and cumulative current account deficits in red. Darker tones correspond to larger cumulative surpluses or deficits. If the cumulative current accounts of all countries were more or less balanced, then the heat map would be filled in with only light colors. The fact that the map has several dark green and dark red patches is therefore an indication that some countries have been consistently borrowing from the rest of the world and others consistently lending over the past 38 years.

The United States appears in dark red and China in dark green, reflecting the fact that the former is the world's largest external debtor and the latter one of the world's largest creditors. More generally, the pattern that emerges is that over the past four decades, the lenders of the world have been Japan, China, Germany, and oil- and gas-exporting countries (Russia, Norway, Saudi Arabia, Kuwait, United Arab Emirates, and Qatar). The rest of the world, especially the United States, has been borrowing from these countries.

This chapter presents an anatomy of external debt and its components in the United States and other countries and traces them across time. It will answer questions such as what international transactions contributed the most to making the United States the largest external debtor in the world? How much of the U.S. external debt stems from imbalances with China? And how do changes in asset prices,

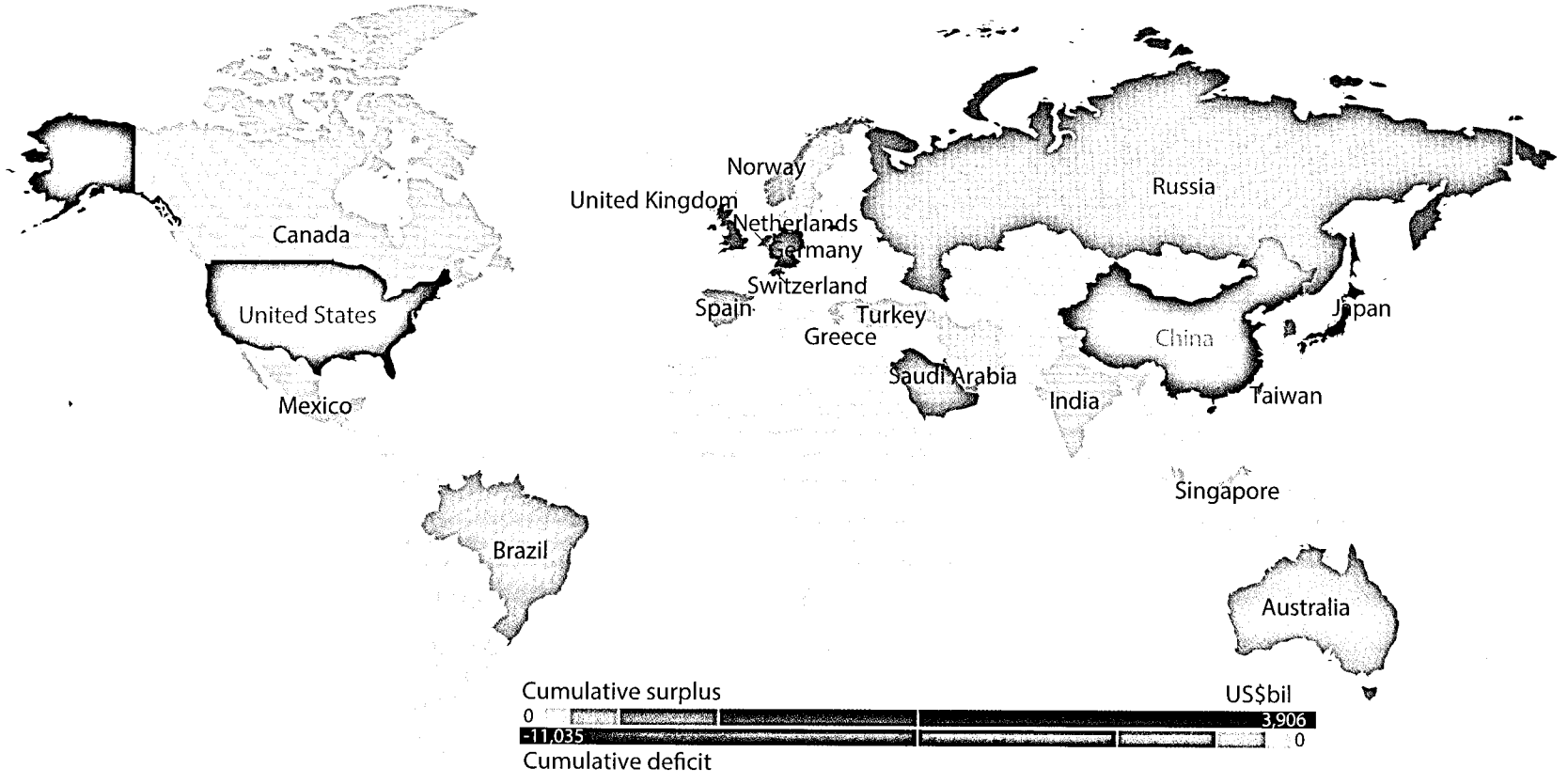


Figure 1.1. Cumulative Current Account Balances around the World: 1980–2017

*Notes*: The map shows the sum of annual current account balances (in billions of U.S. dollars) in 182 countries covering the period 1980 to 2017, or 38 years. For a country to be included in the sample at least 20 consecutive years of current account data are required. The resulting panel is unbalanced. For 138 countries there are 38 observations, and for the average country there are 35 observations. Cumulative current account surpluses appear in green and cumulative current account deficits in red. There are six shades of red and green corresponding to, respectively, at least one half, one fourth, one eighth, one sixteenth, and one thirty-second of the maximum cumulative current account deficit (U.S.: −$11,035bn) and the maximum cumulative current account surplus (Japan: $3,906bn). Countries with less than 20 years of data appear in gray. Country names are displayed for the countries with the top 10 largest cumulated current account surpluses and deficits. The data source is Philip R. Lane and Gian Maria Milesi-Ferretti (2017), "International Financial Integration in the Aftermath of the Global Financial Crisis," IMF Working Paper 17/115.

such as stock prices and exchange rates, affect the net foreign asset position of a country? Before addressing these and other related questions, the chapter begins by introducing some basic concepts related to a country's external accounts.

## 1.1 The Balance of Payments

A country's international transactions are recorded in the *balance of payments accounts* (also called *international transactions accounts*, ITA). In the United States this data is produced by the Bureau of Economic Analysis (BEA). The balance of payments has two main components: the *current account* and the *financial account.* The current account records exports and imports of goods and services and international receipts or payments of income. Exports of goods and services and income receipts enter with a plus and imports of goods and services and income payments enter with a minus. For example, if a U.S. resident buys a smartphone from South Korea for $500, then the U.S. current account goes down by $500. This is because this transaction represents an import of goods worth $500. If the French car maker Peugeot pays €100 in dividends to an American shareholder and the exchange rate is $1.1 per euro, then the U.S. current account increases by $110, because this transaction represents an international income receipt of a U.S. resident in this amount.

The financial account keeps record of transactions in financial assets between residents and nonresidents. Sales of assets to nonresidents represent an export of an asset and are given a positive sign in the financial account. Purchases of assets from nonresidents represent an import of a financial asset and enter the financial account with a negative sign. For example, in the case of the import of the smartphone, suppose the U.S. resident pays for the phone with U.S. currency, then this represents a sale (export) of U.S. financial assets (currency) to a South Korean resident (Samsung Electronics, say) in the amount of $500. Accordingly, the U.S. financial account records a positive entry of $500. In the example of the dividend receipt, the American resident "imports" €100 from the French company Peugeot, so the U.S. financial account goes down by $110 (or €100).

The smartphone and dividend receipt examples illustrate a fundamental principle of balance of payments accounting known as *double-entry bookkeeping.* Each transaction enters the balance of payments twice, once with a positive sign and once with a negative sign. To illustrate this principle with another example, suppose that an Italian friend of yours comes to visit you in New York and stays at the Lucerne Hotel. He pays $400 for his lodging with his Italian VISA card. In this case, the United States is exporting a service (hotel accommodation), so the U.S. current account increases by $400. At the same time, the Lucerne Hotel (a U.S. resident) purchases (imports) a financial asset worth $400 (the promise of VISA-Italy, a nonresident, to pay $400), which decreases the U.S. financial account by $400. (Can you figure out how this transaction would be recorded in the Italian balance of payments accounts?)

An implication of the double-entry bookkeeping methodology is that any change in the current account must be reflected in an equivalent change in the country's financial account; that is, the current account equals the difference between

a country's purchases of assets from foreigners and its sales of assets to them, which is the financial account preceded by a minus sign. This relationship is known as the *fundamental balance of payments identity*. Formally,

$$\text{Current Account Balance} = -\text{Financial Account Balance} \tag{1.1}$$

There is a third component of the balance of payments (and thus a third term in the balance of payments identity), called the capital account. It keeps record of international transfers of financial capital. The major types of entries in the capital account are debt forgiveness and migrants' transfers (goods and financial assets accompanying migrants as they leave or enter the country). The capital account is insignificant in the United States, but it can be important in other countries. For instance, in July 2007 the U.S. Treasury Department announced that the United States, Germany, and Russia were providing debt relief to Afghanistan of more than $11 billion. This is a significant amount for the balance of payments accounts of Afghanistan, representing about 99 percent of its foreign debt obligations. But the amount involved in this debt relief operation is a small figure for the balance of payments of the three donor countries. Because the capital account is quantitatively irrelevant for the balance of payments of most countries, we will ignore it in the remainder of the book and will focus on the current account and the financial account.

Let's now take a closer look at each side of the fundamental balance of payments identity (1.1). A more detailed breakdown of the current account is given by

$$\begin{aligned}\text{Current Account Balance} = {} & \text{Trade Balance} \\ & + \text{Income Balance} \\ & + \text{Net Unilateral Transfers.}\end{aligned}$$

In turn, the trade and income balances each include two components, as follows

$$\begin{aligned}\text{Trade Balance} = {} & \text{Merchandise Trade Balance} \\ & + \text{Services Balance}\end{aligned}$$

and

$$\begin{aligned}\text{Income Balance} = {} & \text{Net Investment Income} \\ & + \text{Net International Compensation to Employees.}\end{aligned}$$

The *trade balance*, or *balance on goods and services*, keeps record of *net exports* (i.e., the difference between exports and imports) of goods and services. The *merchandise trade balance*, or *balance on goods*, is given by net exports of goods, and the *services balance* is given by net exports of services, such as transportation, travel expenditures, and legal assistance.

In the *income balance*, *net investment income* is given by the difference between income receipts on U.S.-owned foreign assets and income payments on foreign-owned U.S. assets. Income receipts on U.S.-owned foreign assets enter the income balance with a positive sign. It includes items such as international interest and

dividend receipts and earnings (distributed or reinvested) of U.S.-owned firms operating abroad. Income payments on foreign-owned U.S. assets enter the income balance with a negative sign. Examples of such income payments are interest paid on U.S. government bonds, interest paid on U.S. corporate bonds, and dividends paid on U.S. stocks. In the United States, net investment income is by far the most important component of the income balance.

The second component of the income balance, *net international compensation to employees*, includes, as positive entries, compensation receipts from earnings of U.S. residents employed temporarily abroad, earnings of U.S. residents employed by foreign governments in the United States, and earnings of U.S. residents employed by international organizations located in the United States, such as the United Nations, the International Monetary Fund, and the International Bank for Reconstruction and Development. Negative entries to net international compensation to employees include payments by U.S. residents or institutions to foreign workers (mostly from Canada and Mexico) who commute to work in the United States, foreign students studying in the United States, foreign professionals temporarily residing in the United States, and foreign temporary workers in the United States. In the United States, net international compensation to employees is so small that the income balance is basically equal to net investment income.

The third component of the current account, *net unilateral transfers* (also called secondary income in the ITA accounts), keeps record of the difference between gifts—that is, payments that do not correspond to purchases of any good, service, or asset, received from the rest of the world and gifts made by the United States to foreign countries. One big item in this category is private remittances. For example, payments by a U.S. resident to relatives residing in Mexico would enter with a minus in net unilateral transfers. Another prominent type of unilateral transfer is U.S. government grants, which represent transfers of real resources or financial assets to foreigners for which no repayment is expected.

The financial account has two main components:

$$\begin{aligned}\text{Financial Account} &= \text{Increase in foreign-owned assets in the United States} \\ &\quad - \text{Increase in U.S.-owned assets abroad.}\end{aligned}$$

Foreign-owned assets in the United States include U.S. securities held by foreign residents, U.S. currency held by foreign residents, U.S. borrowing from foreign banks, and foreign direct investment in the United States. U.S.-owned assets abroad include foreign securities, U.S. bank lending to foreigners, and U.S. direct investment abroad.

As mentioned earlier, the double-entry bookkeeping method requires that every international transaction result in two entries in the balance of payments accounts. The two examples at the beginning of this chapter—namely, importing a smartphone and paying for it with cash, and the Italian tourist paying the New York hotel with a credit card—each gives rise to one entry in the current account and one entry in the financial account. However, an international transaction does not necessarily have to give rise to one entry in the current account and one entry in the financial account. It can be the case that it gives rise to two offsetting entries in the financial

account or two offsetting entries in the current account. International transactions that involve the exchange of financial assets generate two entries in the financial account and no entry in the current account. For example, if a U.S. resident purchases shares from Fiat Italy paying with dollars, then the financial account receives both a positive entry (the sale, or export, of dollars to Italy) and a negative entry (the purchase, or import, of equity shares from Italy). As an example of an international transaction that generates two offsetting entries in the current account, suppose the United States donates medications worth $10 million to an African country afflicted by malaria. This gift gives rise to a positive entry of $10 million in the merchandise trade balance (the export of the malaria medication), and a negative entry in the same amount in net unilateral transfers.

## 1.2 The Trade Balance and the Current Account

What does the U.S. current account look like? Take a look at Table 1.1, which displays the U.S. international transactions recorded in the current account for 2020. In that year, the United States experienced a large current account deficit of $647.2 billion or 3.1 percent of gross domestic product (GDP) and also a large trade deficit of $681.7 billion, or 3.3 percent of GDP.

Looking inside the trade balance, Table 1.1 shows that in 2020 the United States was a net importer of goods, with a deficit in the trade of goods of 4.4% of GDP, and, at the same time, a net exporter of services, with a service balance surplus of 1.1% of GDP. The United States has a comparative advantage in the production of human-capital-intensive services, such as professional consulting, higher education, research and development, and health care. At the same time, the United States imports basic and manufactured goods, such as primary commodities (e.g., minerals, fuels, and oils), consumer electronics (e.g., cellphones and computers), and transportation equipment (e.g., motor vehicles and motor vehicle parts).

**Table 1.1.** The Current Account of the United States in 2020

| Item | Billions of dollars | Percentage of GDP |
|---|---|---|
| Current Account | −647.2 | −3.1 |
| Trade Balance | −681.7 | −3.3 |
| Balance on Goods | −915.6 | −4.4 |
| Balance on Services | 233.9 | 1.1 |
| Income Balance | 181.6 | 0.9 |
| Net Investment Income | 190.9 | 0.9 |
| Compensation of Employees | −9.3 | −0.0 |
| Net Unilateral Transfers | −147.1 | −0.7 |
| Private Transfers | −127.1 | −0.6 |
| U.S. Government Transfers | −20.0 | −0.1 |

*Data Source*: Authors' calculations based on data from ITA Tables 1.1 and 5.1 and NIPA Table 1.1.5. of the BEA, available at www.bea.gov.

In 2020 the trade balance and the current account were roughly equal to each other in magnitude, −3.3 versus −3.1 percent of GDP. This means that the sum of the other two components of the current account, the income balance and net unilateral transfers, was small. Individually, however, these two components of the current account were sizable, close to 1 percent of GDP, but of opposite sign.

The income balance in 2020 was positive and equal to $181.6 billion, or 0.9 percent of GDP. Almost all of this amount was accounted for by net investment income (net international receipts of interest, dividends, profits, etc.), with compensation of employees representing a negligible figure. The sizable positive value of net investment income is puzzling because, as the heat map in Figure 1.1 suggests, the United States is a large net external debtor, so one would expect that on net it makes payments to rather than receives payments from the rest of the world. In Section 1.7, we discuss what could be behind this paradoxical fact.

Table 1.1 displays a negative balance for net unilateral transfers in 2020 equal to −$147.1 billion, or −0.7 percent of GDP. This means that in 2020 the United States made more gifts to other nations than it received. This is typically the case. A large fraction of these international gifts are remittances of foreign workers residing in the United States to relatives in their countries of origin. Typically, U.S. residents send much larger remittances abroad than foreign residents send to the United States. In fact, income from international remittances is so small that it is often not reported separately in the ITA.

Overall, net remittances are a small fraction of the U.S. current account. But for some countries, they can represent a substantial source of income. For example, in 2016 Honduras received remittances for $3.9 billion, almost exclusively coming from the United States. This figure represents 18.4 percent of Honduras' GDP, but only 0.02 percent of the United States'. The same is true for other small countries in Central America. For El Salvador, for example, the flow of dollars coming from the United States has been so large that in 2001 its government decided to adopt the U.S. dollar as legal tender. Even for much larger economies, remittances can represent a nonnegligible source of income. For example, in 2016 Mexico received $28.7 billion in remittances amounting to 2.7 percent of its GDP. As in the cases of Honduras and El Salvador, virtually all of the remittances received by Mexico originated in the United States, for which they represented only 0.15 percent of GDP.

U.S. net unilateral transfers have been negative ever since the end of World War II, with one exception. In 1991, net unilateral transfers were positive because of the payments the United States received from its military allies in compensation for the expenses incurred during the Gulf War.

Deficits in the trade balance and the current account have been consistently observed in the United States since the early 1980s. Figure 1.2 displays this pattern. It graphs the current account and the trade balance as percentages of GDP over the period 1960 to 2020. Until the mid-1970s, the trade balance and the current account were positive albeit small, less than 1 percent of GDP. In the early 1980s, both accounts turned into deficits which grew over time, reaching a peak of about 5.5 percent of GDP in 2008, just before the beginning of the global financial crisis. After 2008, the current account and the trade balance deficits shrunk to about 3 percent of

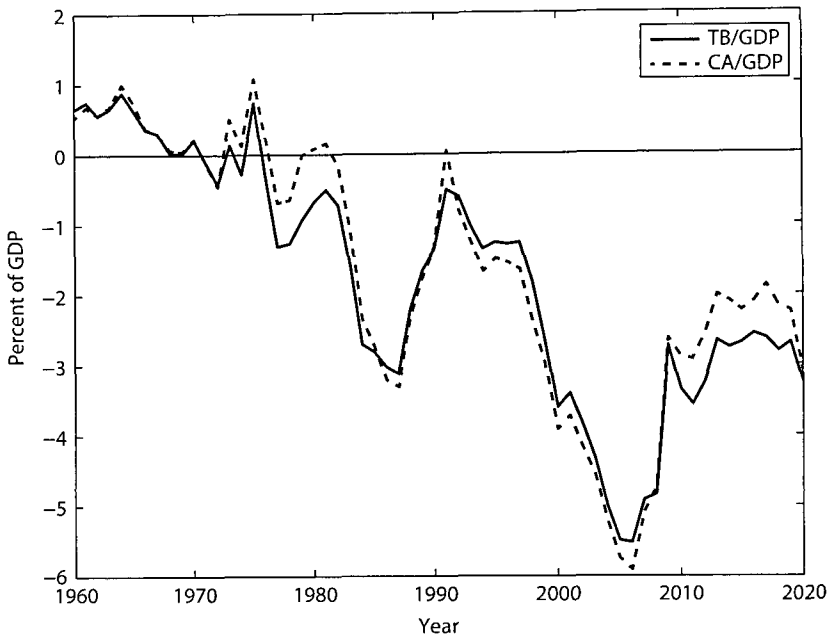


Figure 1.2. The U.S. Trade Balance and Current Account as Percentages of GDP, 1960–2020
*Notes*: *TB* and *CA* stand for trade balance and current account, respectively. Authors' calculations based on data from ITA Table 1.1 and NIPA Table 1.1.5 of the BEA.

GDP. In sum, for the past 40 years, the United States has displayed current account and trade balance deficits of about equal magnitude.

## 1.3 The Trade Balance and the Current Account across Countries

We just saw that in the United States the current account and the trade balance typically have the same sign and size. However, this need not be the case for every country. In principle, the current account can be larger or smaller than the trade balance. Furthermore, the trade balance and the current account can be both positive, both negative, or of opposite signs.

Figure 1.3 illustrates this point. It displays the trade balance and the current account as percentage of GDP, denoted *TB/GDP* and *CA/GDP*, respectively, in 2019 for 82 countries. Most countries lie either in the first quadrant or the third quadrant. This means that for most countries the trade balance and the current account have the same sign. Furthermore, many (TB/GDP, CA/GDP) pairs fall around the 45-degree line. This means that for many countries the trade balance and the current account have not only the same sign but also roughly the same magnitude. Put differently, the clustering around the 45-degree line suggests that, as in the United States, in many countries, the trade balance is the dominant component of the current account.

In Figure 1.3 the space (TB/GDP, CA/GDP) is divided into six regions, depending on the signs of the trade balance and the current account and on their relative

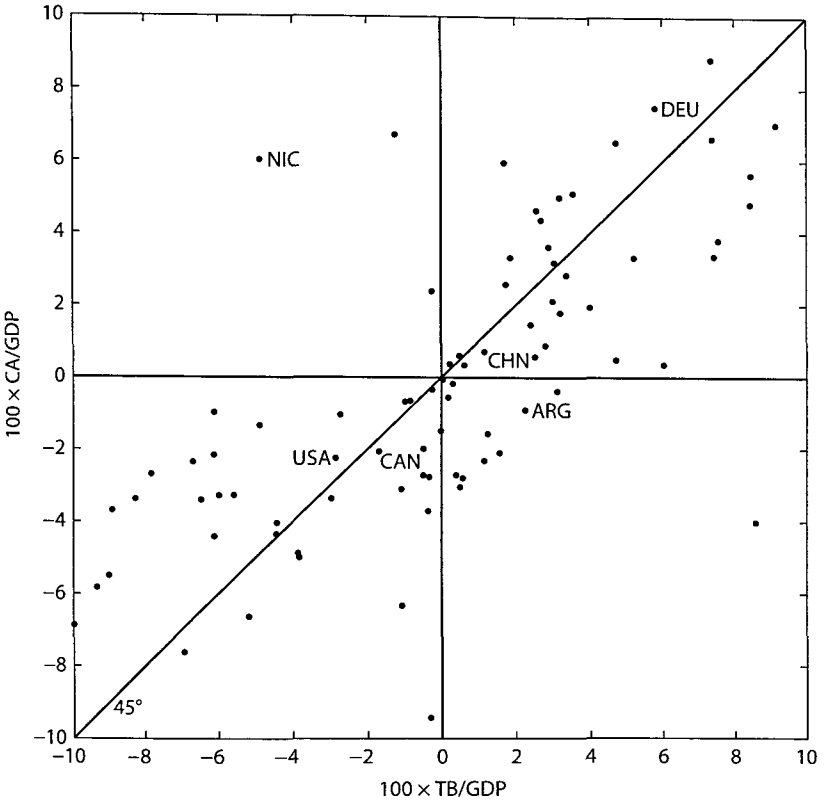


Figure 1.3. Trade Balance and Current Account as Percentage of GDP across Countries in 2019

*Notes*: TB denotes the trade balance and CA denotes the current account balance. The data source is World Development Indicators (WDI), available at databank.worldbank.org. There are 82 countries included in the figure. Country names are shown using ISO abbreviations. Countries in the WDI database with trade balances or current account balances in excess of ±10 percent of GDP were excluded.

magnitudes. Table 1.2 extracts six countries from the 82 countries shown in Figure 1.3, one from each of the six regions into which the figure is divided.

China is an example of a country that in 2019 ran surpluses in both the trade balance and the current account, with the trade balance exceeding the current account (a dot in the first quadrant and below the 45-degree line). The trade balance surplus (0.9 percent of GDP) was larger than the current account surplus (0.7 percent of GDP) because China ran a deficit in the income balance (−0.3 percent of GDP); in particular, in net investment income. This is surprising because, as the heat map in Figure 1.1 suggests, China is a large net creditor to the rest of the world, so one would expect that its net investment income (such as net interest, dividend, and earnings income) be positive. In Section 1.7.3, we document that this phenomenon has occurred not only in 2019 but persistently over the past quarter century and explain why it might be taking place.

**Table 1.2.** The Current Account of Selected Countries as Percentage of GDP in 2019

| Item | ARG | CAN | CHN | DEU | NIC | USA |
|---|---|---|---|---|---|---|
| Current Account | −0.9 | −2.1 | 0.7 | 7.5 | 6.0 | −2.2 |
| Trade Balance | 2.9 | −1.6 | 0.9 | 5.7 | −4.3 | −2.7 |
| Income Balance | −4.0 | −0.3 | −0.3 | 3.2 | −3.7 | 1.1 |
| Net Investment Income | −4.0 | −0.1 | −0.3 | 3.2 | −3.7 | 1.2 |
| Compensation of Employees | −0.0 | −0.3 | 0.0 | 0.0 | 0.0 | −0.1 |
| Net Unilateral Transfers | 0.2 | −0.1 | 0.1 | −1.4 | 14.0 | −0.7 |
| Private Transfers | 0.0 | −0.3 | 0.1 | −0.6 | 14.0 | −0.6 |
| Government Transfers | 0.2 | 0.2 | −0.0 | −0.8 | 0.0 | −0.1 |

*Notes*: The table presents the current account of Argentina, Canada, China, Germany, Nicaragua, and the United States in 2019 expressed as a percentage of GDP.

*Data Sources*: Authors' calculations based on data from World Development Indicators, available online at databank.worldbank.org, and the IMF's Balance of Payments and International Investment Position Dataset, available online at data.imf.org.

Like China, Germany displays both a current account and a trade balance surplus. However, unlike China, the German current account surplus is larger than its trade balance surplus (a dot in the first quadrant and above the 45-degree line). This difference can be explained by the fact that Germany, unlike China, receives positive net investment income (3.2 percent of GDP) on its positive net foreign asset position. Nicaragua provides an example of a country with a current account surplus (6.0 percent of GDP), in spite of a sizable trade balance deficit of −4.3 percent of GDP (a dot in the second quadrant). The positive current account balance is the consequence of large personal remittances received (14 percent of GDP), which come mostly from the United States. Canada, the United States, and Argentina all experienced current account deficits in 2019. In the case of Canada and the United States, the current account deficits were associated with trade deficits of about equal sizes. In Canada the current account deficit was larger than the trade deficit (a dot on the third quadrant and below the 45-degree line). This is because Canada had a deficit on the income balance. In particular, the balance on net international compensation to employees was −0.3 percent of GDP, stemming mainly from wages paid by Canadian residents to U.S. residents who commute to work in Canada. Finally, Argentina displays a negative current account balance in spite of running a trade balance surplus (a dot in the fourth quadrant). In this case, the difference between the trade balance and the current account balance is accounted for by a 4.0 percent of GDP deficit in net investment income.

## 1.4 Imbalances in U.S. Trade with China

Figure 1.4 displays the U.S. merchandise trade balance since 1960 and its bilateral merchandise trade balance with China since 1990. The starting date for China

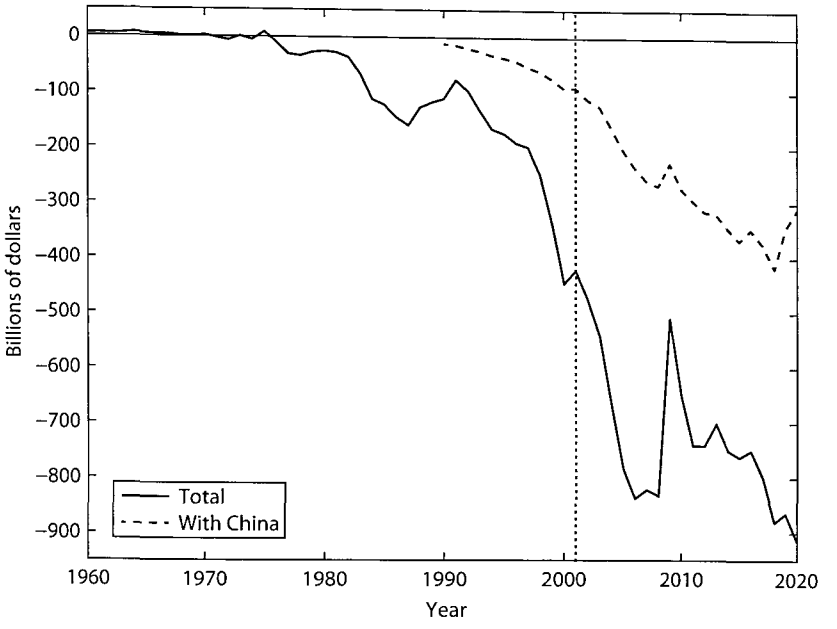


Figure 1.4. The U.S. Merchandise Trade Balance with China, 1990–2020
*Notes*: The data source for the U.S. merchandise trade balance is ITA Table 1.1. The data source for the bilateral merchandise trade balance between the United States and China is the OECD, http://stats.oecd.org, for the period 1990 to 2002 and ITA Table 1.3 for the period 2003 to 2020. The vertical line marks the year 2001, when China became a member of the World Trade Organization.

is dictated by data availability. Most likely, however, the bilateral trade balance prior to 1990 was as small as or even smaller than in 1990 because of legal and political impediments to Sino-American trade. During the 1960s, trade was limited by an existing embargo. Despite the fact that, following his famous trip to China, President Nixon lifted the U.S. trade embargo on China in 1971, and despite the fact that the U.S. Congress passed a trade agreement conferring contingent Most Favored Nation status on China in 1980, trade impediments persisted because of existing laws linking trade benefits with human rights policies of communist countries.

Figure 1.4 shows that the U.S. merchandise trade deficit with China has widened since China became a member of the World Trade Organization (WTO) in December 2001. When a country joins the WTO, it gains improved access to global markets and, in return, must grant other countries better access to its domestic market. In the case of China, the WTO agreement obliged this country to cut import tariffs and give foreign businesses greater access to domestic insurance, banking, and telecommunications markets. In 2001 the deficit on the U.S. bilateral merchandise trade balance with China was $90 billion, or 21 percent of the overall U.S. merchandise trade deficit. By 2015, the deficit with China had risen to $368 billion, or 48 percent of the overall U.S. merchandise trade deficit. By the end of the sample, the bilateral trade deficit fell significantly. In 2020 it stood at $310 billion, or 34 percent of the overall U.S. merchandise trade deficit. Two candidate explanations for this

narrowing of the bilateral trade imbalances are an increase in trade triangulation after the imposition of import tariffs by the Trump administration starting in 2018 and the COVID-19 pandemic.

## 1.5 The Current Account and the Net International Investment Position

One reason why the concept of current account balance is economically important is that it reflects a country's net borrowing needs. For example, in 2020 the United States ran a current account deficit of $647.2 billion (Table 1.1). To pay for this deficit, the country must either reduce its international asset position or increase its international liability position, or both. In this way, the current account is related to changes in a country's *net international investment position* (NIIP). This term is used to refer to a country's net foreign wealth; that is, the difference between the value of foreign assets owned by the country's residents and the value of the country's assets owned by foreign residents. When the NIIP is negative, it is referred to as the country's net external debt.

The NIIP is a stock, while the current account is a flow. To understand the difference between a flow and a stock variable in this context, think of a water tank. The level of water in the tank (a stock) is the NIIP of the country. The current account is the flow of water that might enter or leave the tank through pipes. When the flow of water that enters the tank through pipes (exports, interest and dividends received from investments in foreign countries) is larger than the flow of water that leaves the tank (imports, interest and dividends paid on foreign-owned investments in the country), the current account is positive, and the stock of water in the tank, the NIIP, rises over time. By contrast, when the flow of water that leaves the tank is larger than the flow of water that enters the tank, the current account is negative, and the level of water in the tank, the NIIP, falls over time.

Figure 1.5 shows the U.S. current account and NIIP expressed in percent of GDP over the periods 1960 to 2020 and 1976 to 2020, respectively. (The later starting date of the NIIP series is determined by data availability.) The U.S. net international investment position was positive at the beginning of the sample. However, in the early 1980s, the United States began running large current account deficits. By 1989 these deficits had eroded the net foreign wealth of the United States and the country became a net debtor to the rest of the world for the first time since World War I.

The U.S. current account deficits of the 1980s did not turn out to be temporary. As a consequence, by the end of the 1990s, the United States had become the world's largest external debtor. The current account deficit continued to rise for 25 more years. Only shortly before the onset of the global financial crisis of 2008 did the downward trend stop and current account deficits became smaller.

By the end of 2020, the net international investment position of the United States stood at −$14.1 trillion or −67 percent of GDP. This is a big number, and many economists wonder whether the observed downward trend in the NIIP is sustainable over time.[1] The concern stems from the fact that countries that accumulated

[1] Chapter 2 analyzes this concern in detail.

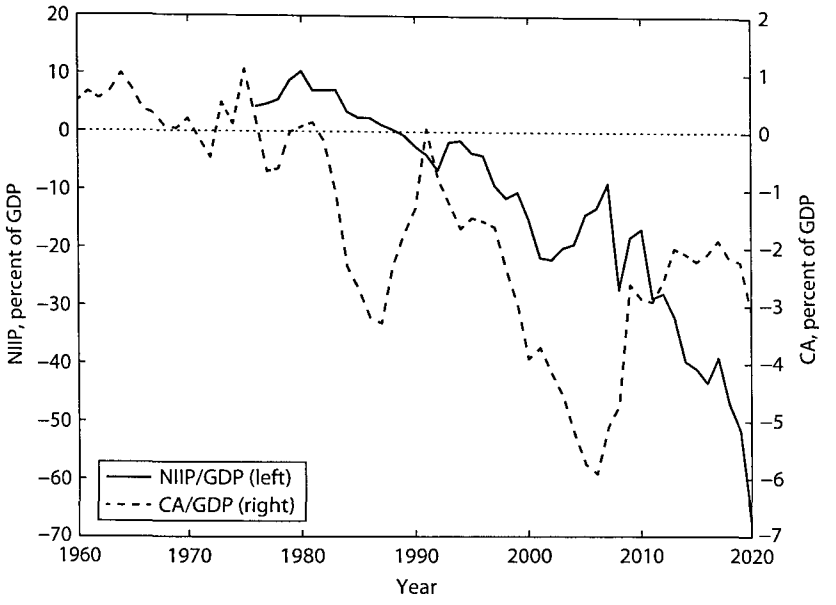


Figure 1.5. The U.S. Current Account and Net International Investment Position
*Notes*: *CA*, *NIIP*, and *GDP* stand for current account, net international investment position, and gross domestic product, respectively. The sample period for CA is 1960 to 2020 and for NIIP 1976 to 2020. Authors' calculations based on data from ITA Table 1.1, IIP Table 1.1, and NIPA Table 1.1.5 of the BEA.

large external-debt-to-GDP ratios in the past, such as many Latin American countries in the 1980s, Southeast Asian countries in the 1990s, and more recently peripheral European countries, have experienced sudden reversals in international capital flows that were followed by costly financial and economic crises. These episodes are known as *sudden stops*.[2] The 2008 financial meltdown in the United States brought this issue to the fore.

## 1.6 Valuation Changes and the Net International Investment Position

The current account is not the only source of changes in a country's NIIP. It can also change due to variations in the prices of the financial instruments that comprise a country's international asset and liability positions. So we have that

$$\Delta NIIP = CA + \text{valuation changes}, \tag{1.2}$$

where $\Delta NIIP$ denotes the change in the net international investment position and $CA$ denotes the current account balance.

[2]Chapters 10 and 13 present historical examples of sudden stops and develop tools to analyze them.

### 1.6.1 EXAMPLES OF VALUATION CHANGES

To understand how valuation changes can alter a country's NIIP, consider the following hypothetical example. Suppose a country's international asset position, denoted $A$, consists of 25 shares in the Italian company Fiat. Suppose the price of each Fiat share is €2. Assume that the exchange rate is \$2 per euro. Then, the country's foreign asset position is $A = 25 \times 2 \times 2 = \$100$. Suppose that the country's international liabilities, denoted $L$, consist of 80 units of bonds issued by the local government and held by foreigners. Suppose further that the price of local bonds is \$1 per unit, where the dollar is the local currency. Then we have that total foreign liabilities are $L = 80 \times 1 = \$80$. The country's NIIP is given by the difference between its international asset position, $A$, and its international liability position, $L$, or $NIIP = A - L = 100 - 80 = \$20$.

Suppose now that the euro suffers a significant depreciation, losing half of its value relative to the dollar. The new exchange rate is therefore \$1 per euro. Since the country's international asset position is denominated in euros, its value in dollars automatically falls. Specifically, its new value is $A' = 25 \times 2 \times 1 = \$50$. The country's international liability position measured in dollars does not change, because it is composed of instruments denominated in dollars. As a result, the country's new net international investment position is $NIIP' = A' - L = 50 - 80 = -\$30$. It follows that just because of a movement in the exchange rate, the country went from being a net creditor of the rest of the world to being a net debtor. This example illustrates that, all else equal, a depreciation of the foreign currency can reduce a country's net foreign asset position.

Consider now the effect of an increase in foreign stock prices on the NIIP of the domestic country. Specifically, suppose that the price of the Fiat stock jumps up from €2 to €7. This price change increases the value of the country's foreign asset position to $25 \times 7 = €175$ or, at an exchange rate of \$1 per euro, to \$175. The country's international liabilities do not change in value. The net international investment position then turns positive again and equals $175 - 80 = \$95$. This example shows that, all else equal, an increase in foreign stock prices can improve a country's NIIP.

Finally, suppose that because of a successful fiscal reform in the domestic country, the price of local government bonds increases from \$1 to \$1.5. In this case, the country's international asset position remains unchanged at \$175, but its international liability position jumps up to $80 \times 1.5 = \$120$. As a consequence, the NIIP falls from 95 to $175 - 120 = \$55$.

### 1.6.2 VALUATION CHANGES IN THE UNITED STATES

The above hypothetical examples illustrate how a country's NIIP can display large swings because of movements in asset prices or exchange rates. This is indeed the case in actual data as well. Valuation changes have been an important source of movements in the NIIP of the United States, especially since 2000.

Figure 1.6 displays valuation changes between 1977 and 2020. The figure reveals a number of noticeable characteristics of valuation changes. First, valuation changes can be large, exceeding $\pm 10$ percent of GDP in some years. Second, large valuation

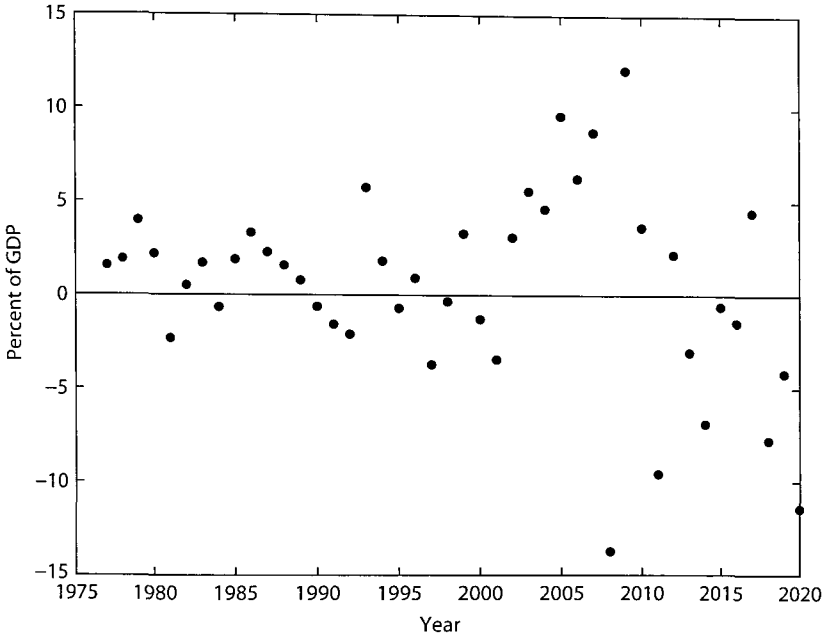


Figure 1.6. Valuation Changes in the U.S. Net International Investment Position, 1977–2020

*Notes*: The figure shows year-over-year changes in the U.S. net international investment position arising from valuation changes expressed in percent of GDP. Authors' calculations based on data from ITA Table 1.1, IIP Table 1.1, and NIPA Table 1.1.5 of the BEA.

changes are a recent phenomenon. Until 2000, the typical valuation change was between −1 and 2 percent of GDP. Third, the period 2000 to 2020 has also been characterized by higher volatility in valuation changes, as both increases and decreases in valuation became larger. Fourth, over the period 2000 to 2010 the United States experienced mainly valuation gains, whereas over the period 2011 to 2020 it experienced mainly valuation losses.

Why have valuation changes become so large lately? One reason is that gross international asset and liability positions have exploded since the 2000s, as shown in Figure 1.7. Gross positions grew from about 80 percent of GDP in 2000 to over 160 percent by 2020. When gross positions are large relative to net positions, just a small change in the price of an asset that is asymmetrically represented in assets and liabilities can result in large changes in the value of the net position. For example, most of the United States' international liabilities are denominated in dollars, whereas most of its international asset position is denominated in foreign currency. As a result, a small appreciation of the dollar vis-à-vis other currencies can cause a significant deterioration of the NIIP, if the gross positions are large.

Valuation changes played a dominant role in the evolution of the U.S. net international investment position in the run-up to the global financial crisis of 2008. The period 2002–2007 exhibited the largest current account deficits since 1976, which is the beginning of our sample. In each of these years, the current account deficit

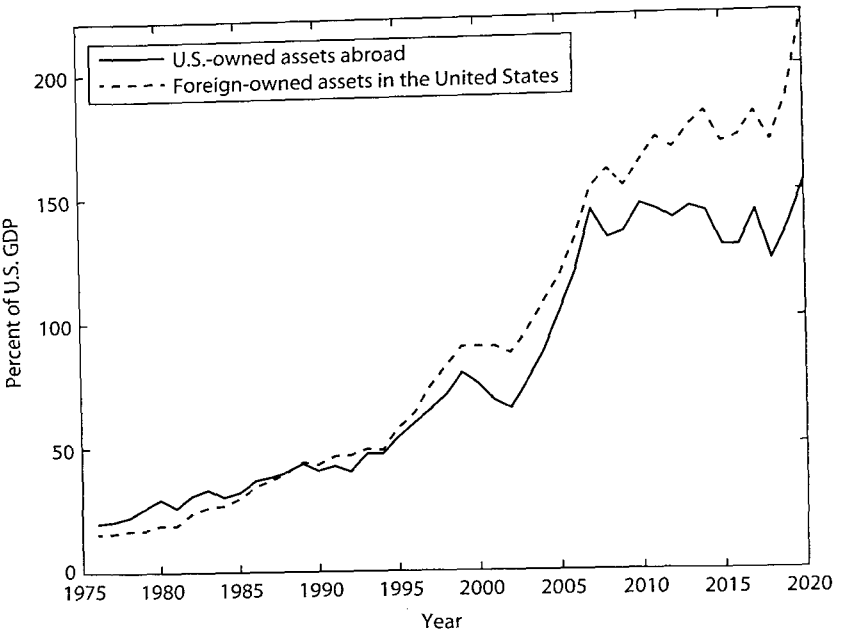


Figure 1.7. U.S.-Owned Assets Abroad and Foreign-Owned Assets in the United States, 1976–2020

*Notes*: The figure shows that the gross U.S. foreign asset position and the gross U.S. foreign liability position have risen sharply since the mid 1990s. Authors' calculations based on data from IIP Table 1.1 and NIPA Table 1.1.5 of the BEA.

exceeded 4 percent of GDP, with a cumulative deficit of $3.9 trillion, or 32 percent of GDP. Nevertheless, the NIIP actually improved by $80 billion. The discrepancy of almost $4 trillion between the accumulated current account balances and the change in the NIIP was the result of increases in the market value of U.S.-owned foreign assets relative to foreign-owned U.S. assets.

What caused these large changes in the value of assets in favor of the United States? Milesi-Ferretti, of the International Monetary Fund, identifies two main factors.[3] First, the U.S. dollar depreciated relative to other currencies by about 20 percent. This is a relevant factor because, as we mentioned earlier, the currency denomination of the U.S. foreign asset and liability positions is asymmetric. The asset side is composed mostly of foreign-currency-denominated financial instruments, while the liability side is mostly composed of dollar-denominated instruments. As a result, a depreciation of the U.S. dollar increases the dollar value of U.S.-owned assets, while leaving more or less unchanged the dollar value of foreign-owned assets, thereby strengthening the U.S. net international investment position. Second, the stock markets in foreign countries significantly outperformed the U.S. stock market. Specifically, a dollar invested in foreign stock markets in 2002 returned $2.90 by the end of 2007. By contrast, a dollar invested in the U.S. market in

[3] Gian Maria Milesi-Ferretti, "A $2 Trillion Question," VOX, January 28, 2009, available online at http://www.voxeu.org.

2002 yielded only $1.90 at the end of 2007. These gains in foreign equity contributed to an increase in the net equity position of the United States from an insignificant level of $40 billion in 2002 to $3 trillion in 2007.

The large positive valuation changes observed in the period 2002–2007, which allowed the United States to run unprecedented current account deficits without a concomitant deterioration of its net international investment position, came to an abrupt end in 2008. Look at the dot corresponding to 2008 in Figure 1.6, which shows that valuation losses in that year were almost 15 percent of GDP. The source of this drop in value was primarily the stock market. In 2008, stock markets around the world plummeted. Because the net equity position of the United States had grown so large by the beginning of 2008, the decline in stock prices outside of the United States inflicted large losses on the value of the U.S. equity portfolio.

Since 2010, and especially during the COVID-19 pandemic, the U.S. NIIP has suffered mostly valuation losses (see Figure 1.6). This has been the consequence of three developments. First, both the U.S. foreign portfolio equity asset and liability positions more than doubled during this period. This means that the U.S. NIIP became more sensitive to changes in stock prices. Second, the U.S. net foreign portfolio equity position has narrowed, as equity liabilities grew faster than equity assets. And third, for most years since 2010 U.S. stock prices have outperformed foreign stock prices. Every time the U.S. stock market goes up, the value of U.S. portfolio equity liabilities (U.S. stocks held by foreign investors) goes up. And when the foreign stock market goes up, the dollar value of the U.S. portfolio equity asset position (foreign stocks held by U.S. investors) goes up. Thus, if U.S. stocks outperform foreign stocks, as they did in most years since 2010, the value of the U.S. net foreign portfolio equity position, and, all else equal, the value of its NIIP go down.

### 1.6.3 A HYPOTHETICAL NIIP THAT EXCLUDES VALUATION CHANGES

Another way to visualize the importance of valuation changes is to compare the actual NIIP with a hypothetical one that results from removing valuation changes. To compute a time series for this hypothetical NIIP, start by setting its initial value equal to the actual value. Our sample starts in 1976, so we set

$$\text{Hypothetical } NIIP_{1976} = NIIP_{1976}.$$

Now, according to identity (1.2), after removing valuation changes in 1977, the change in the hypothetical NIIP between 1976 and 1977 equals the current account in 1977; that is,

$$\text{Hypothetical } NIIP_{1977} = NIIP_{1976} + CA_{1977},$$

where $CA_{1977}$ is the actual current account in 1977. The hypothetical NIIP in 1978 is given by the NIIP in 1976 plus the accumulated current accounts from 1977 to 1978, that is,

$$\text{Hypothetical } NIIP_{1978} = NIIP_{1976} + CA_{1977} + CA_{1978}.$$

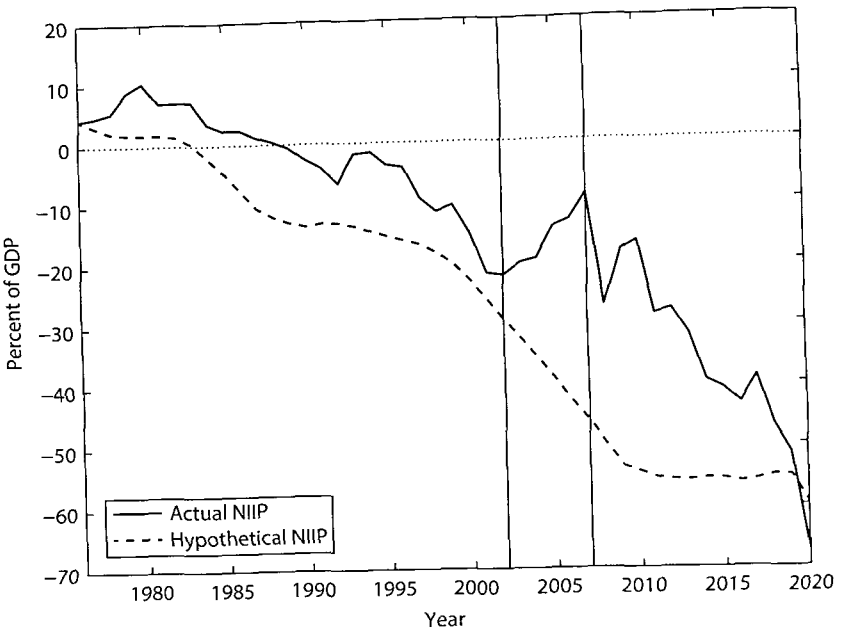


Figure 1.8. Actual and Hypothetical U.S. *NIIP* in Percent of GDP, 1976–2020
*Notes*: The hypothetical *NIIP* for a given year is computed as the sum of the *NIIP* in 1976 and the cumulative sum of current account balances from 1977 to the year in question. The vertical lines indicate the years 2002 and 2007, respectively. Authors' calculations based on data from IIP Table 1.1, ITA Table 1.1, and NIPA Table 1.1.5 of the BEA.

In general, for any year $t > 1978$, the hypothetical NIIP is given by the actual NIIP in 1976 plus the accumulated current accounts between 1977 and $t$. Formally,

$$\text{Hypothetical } NIIP_t = NIIP_{1976} + CA_{1977} + CA_{1978} + \cdots + CA_t.$$

Figure 1.8 plots the actual and hypothetical NIIPs over the period 1976 to 2020 in percent of GDP. Until 2002, the actual and hypothetical NIIPs were not that different from each other, implying that valuation changes were not sizable. In 2002, however, the hypothetical NIIP started to fall at a much faster pace than its actual counterpart. This means that after 2002 the United States started to benefit from large valuation gains. Between 2001 and 2007, the gap between the actual and hypothetical NIIPs widened from 4 percent to 37 percent of GDP. Without this lucky strike, all other things equal, the U.S. net foreign asset position in 2007 would have been an external debt of 46 percent of GDP instead of the actual 9 percent. The reversal of fortune that came with the global financial crisis of 2008 is evident from the narrowing of the gap between the two NIIPs. By 2019 this gap had shrunk to only 4 percent of GDP, a figure not significantly different from the ones observed prior to the exuberant quinquennial 2002–2007. In 2020, in spite of the economic crisis brought about by the COVID-19 pandemic, the U.S. stock market boomed and outperformed international equity markets. As a result, the United States suffered large valuation losses

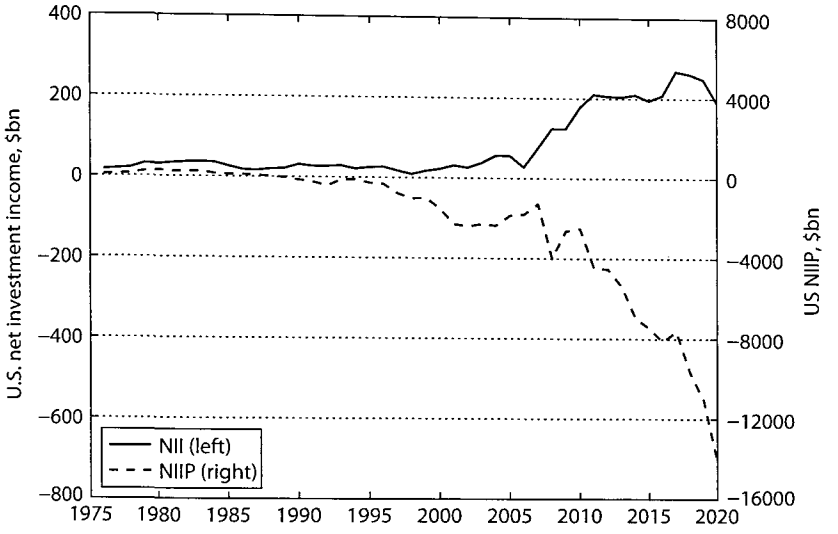


Figure 1.9. Net Investment Income and the Net International Investment Position, United States 1976–2020

*Notes*: Authors' calculations based on data from IIP Table 1.1 and ITA Table 1.1 of the BEA.

of 11.4 percent of GDP, which closed the gap between the hypothetical and actual NIIPs for the first time since 1976. In fact, by the end of 2020, the actual NIIP was 8 percentage points of GDP below the hypothetical one, indicating that over the period 1976 to 2020 the United States experienced a cumulative valuation loss.

## 1.7 The *NIIP*—*NII* Paradox

We have documented that since 1989, the U.S. net international investment position (*NIIP*) has been negative (Figure 1.5). This means that since 1989 the United States has been a net debtor to the rest of the world. One would therefore expect that during this period the United States paid more interest and dividends to the rest of the world than it received. In other words, one would expect that the net investment income (*NII*) component of the current account be negative. This is, however, not observed in the data. Take a look at Figure 1.9. It shows net investment income and the NIIP of the United States since 1976. Net investment income is positive throughout the sample, whereas the NIIP has been negative since 1989. How could it be that a debtor country, instead of having to make payments on its debt, receives income on it? We call this puzzling pattern the *NIIP—NII paradox*. We next discuss two possible explanations.

### 1.7.1 DARK MATTER

One explanation of the *NIIP—NII* paradox, proposed by Ricardo Hausmann and Federico Sturzenegger, is that the BEA may underestimate the net foreign asset

holdings of the United States.[4] The source of the underestimation according to this explanation is that U.S. foreign direct investment contains intangible capital, such as entrepreneurial capital and brand capital, whose value is not correctly reflected in the official balance of payments. At the same time, the argument goes, this intangible capital invested abroad may generate income for the United States, which is appropriately recorded. It thus becomes possible that the United States could display a negative net foreign asset position and at the same time positive net investment income. Hausmann and Sturzenegger refer to the unrecorded U.S.-owned foreign assets as *dark matter*.

To illustrate the dark matter argument, consider a McDonald's restaurant operating in Moscow. This foreign direct investment will show in the U.S. foreign asset position with a dollar amount equivalent to the amount McDonald's invested in items such as land, the building, cooking equipment, and restaurant furniture. However, the market value of this investment may exceed the actual amount of dollars invested. The reason is that the brand McDonald's provides extra value to the goods (the burgers) the restaurant produces. It follows that in this case the balance of payments, by not taking into account the intangible brand component of McDonald's foreign direct investment, would underestimate the U.S. international asset position. On the other hand, the profits generated by the Moscow branch of McDonald's are observable and recorded, so they make their way into the income account of the balance of payments.

How much dark matter was there in 2020? Let *TNIIP* denote the "true" net international investment position and *NIIP* the recorded one. Then we have that

$$TNIIP = NIIP + \text{Dark Matter}.$$

Let $r$ denote the interest rate on net foreign assets. Then, net investment income equals the return on the country's true net international investment position,

$$NII = r \times TNIIP.$$

In this expression, we use *TNIIP* and not *NIIP* to calculate *NII* because, according to the dark matter hypothesis, the recorded level of *NII* appropriately reflects the return on the true level of net international investment. In 2020, *NII* was \$0.1909 trillion (see Table 1.1). Suppose that $r$ is equal to 5 percent per year, which is about the historical average real rate of return on equities. Then, we have that $TNIIP = 0.1909/0.05 = \$3.8$ trillion. The recorded *NIIP* at the beginning of 2020 was $-\$11.1$ trillion. So, according to the dark matter hypothesis, the United States doesn't owe \$11.1 trillion to the rest of the world. On the contrary, the rest of the world owes \$3.8 trillion to the United States. This means that dark matter, the difference between the true NIIP and the observed NIIP, was $3.8 - (-11.1) = \$14.9$ trillion. This seems like a big number to go under the radar of the BEA. It thus seems in order to consider a competing explanation of the *NIIP*—*NII* paradox.

[4] Ricardo Hausmann and Federico Sturzenegger, "U.S. and Global Imbalances: Can Dark Matter Prevent a Big Bang?," working paper CID (Center For International Development), Harvard University, 2005.

### 1.7.2 RETURN DIFFERENTIALS

An alternative explanation for the paradoxical combination of a negative net international investment position and positive net investment income is that the United States earns a higher interest rate on its foreign asset holdings than foreigners earn on their U.S. asset holdings. The rationale behind this explanation is the observation that the U.S. international assets and liabilities are composed of different types of financial instruments. Foreign investors typically hold low-risk U.S. assets, such as Treasury bills. These assets carry a low interest rate. At the same time, American investors tend to purchase more risky foreign assets, such as foreign stocks and foreign direct investment, which earn relatively high returns.

How big does the spread between the interest rate on U.S.-owned foreign assets and the interest rate on foreign-owned U.S. assets have to be to explain the paradox? Let $A$ denote the U.S. gross foreign asset position and $L$ the U.S. gross foreign liability position. Further, let $r^A$ denote the interest rate on $A$ and $r^L$ the interest rate on $L$. Then, we have that

$$NII = r^A A - r^L L. \tag{1.3}$$

Let's put some numbers in this expression. According to the BEA, in 2020 $A$ was \$32.2 trillion and $L$ was \$46.3 trillion. From Table 1.1, we have that in 2020 *NII* was \$0.1909 trillion. Suppose we set $r^L$ equal to the return on U.S. Treasury securities. In 2020, the rate of return on one-year U.S. Treasuries was 0.37 percent per year, so we set $r^L = 0.0037$. Now let's plug these numbers into expression (1.3) to get

$$0.1909 = r^A \times 32.2 - 0.0037 \times 46.3,$$

which yields $r^A = 0.0112$ or 1.12 percent. That is, we need an interest rate spread of 75 basis points ($r^A - r^L = 1.12\% - 0.37\% = 0.75\%$) to explain the paradox. This figure seems more empirically plausible than \$14.9 trillion of dark matter.

The analysis thus far assumes that foreign investors hold only U.S. bonds in their international asset portfolio. This is a good simplification of reality until 2010. But since then, as mentioned in Section 1.6, we have observed a significant increase in the relative participation of U.S. equity in the U.S. international liability position. The ratio of equity to bonds in the U.S. international liability position is closer to 1; that is, roughly half is in equity and half in bonds. Suppose that the return on equity is the same domestically and abroad. Accordingly, the rate of return on U.S. foreign liabilities, $r^L$, is $r^L = \frac{1}{2}(r^A + r^B)$, where $r^B = 0.0037$ is the rate of return on U.S. Treasury securities we used in the baseline exercise. Then we have that equation (1.3) becomes

$$NII = r^A A - \frac{1}{2}(r^A + r^B)L.$$

Evaluating this expression using actual numbers gives

$$0.1909 = r^A \times 32.2 - \frac{1}{2} \times (r^A + 0.0037) \times 46.3,$$

which gives $r^A = 3.06$ percent. The corresponding premium of equity over government bonds is 2.69 percent ($r^A - r^B = 3.06\% - 0.37\%$), which is a more realistic number than the 0.75 percent premium obtained when all of $L$ was assumed to be in U.S. bonds.

### 1.7.3 THE FLIP SIDE OF THE *NIIP—NII* PARADOX

If we divide the world into two groups, the United States and the rest of the world, then the rest of the world should display the flipped paradox—that is, a positive net foreign asset position and negative net investment income. The reason is that what is an asset of the United States is a liability for the rest of the world and vice versa. The same is true for net investment income. International income receipts by the United States are international income payments by the rest of the world. So we have that

$$NIIP^{US} = A^{US} - L^{US} = L^{RW} - A^{RW} = -NIIP^{RW}$$

and

$$NII^{US} = r^A A^{US} - r^L L^{US} = r^A L^{RW} - r^L A^{RW} = -NII^{RW},$$

where the superscripts *US* and *RW* refer to the United States and the rest of the world.

This means that at least one set of countries in the rest of the world must display the flipped paradox. A possible candidate is China, for two reasons: first, as we observed when discussing global imbalances (see the heat map in Figure 1.1), China has been accumulating large current account surpluses for the past quarter century, so it is a likely candidate to have a positive *NIIP*. Second, Figure 1.3 and Table 1.2 show that in 2016 the Chinese trade balance surplus was larger than the current account surplus. There, we pointed out that this was due to a negative *NII*.

Figure 1.10 plots the *NIIP* and *NII* of China for the period 1982 to 2020. It shows that until the country's accession to the WTO in 2001, the NIIP was near zero. Since 2001, China's net foreign asset position grew rapidly, reaching $2.2 trillion by 2020. At the same time, China's net investment income, *NII*, was close to zero until 2001 and then became mostly negative, fluctuating around −$50 billion. Thus, China displays the flipped *NIIP—NII* paradox, a positive NIIP and a negative NII.

A possible explanation of the Chinese flipped paradox is that China saves largely in safe, low-return assets, such as U.S. government bonds, while foreign investment in China is predominantly in the form of high-return assets, such as foreign direct investment.

What about countries other than China and the United States? Because the sizes of *NIIP* and *NII* are smaller in absolute value in China than in the United States, it must be the case that the flipped *NIIP—NII* paradox is observed in the rest of the world taken together.

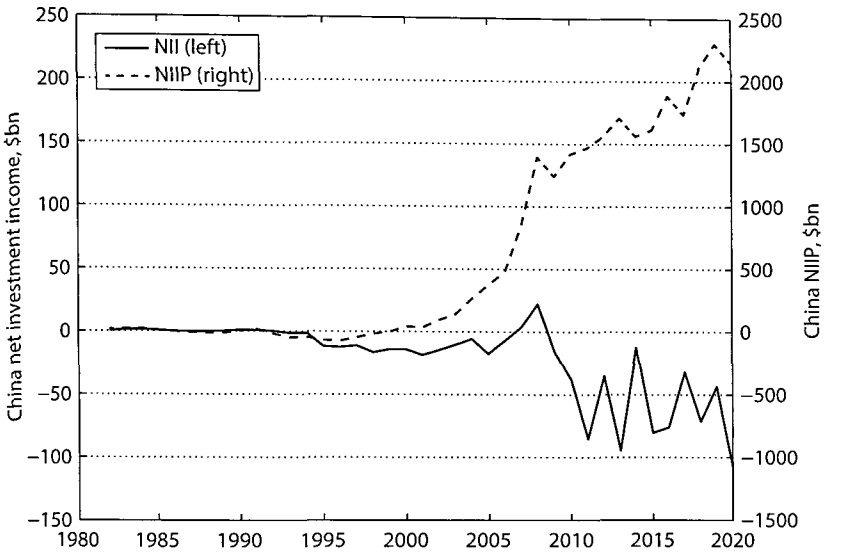


Figure 1.10. Net Investment Income and the Net International Investment Position, China 1982–2020

*Notes*: The figure shows that China displays the flipped *NIIP*—*NII* paradox. Since accession to the WTO in 2001, with the exception of the global financial crisis years (2007 and 2008), China recorded a positive *NIIP* and a negative *NII*.

*Data Sources*: *NIIP* for 1982 to 2017 is from Lane and Milesi-Ferretti, op. cit., and for 2018 to 2020 from International Financial Statistics (IFS). *NII* is from IFS. Reprinted by permission of the authors.

## 1.8 Summing Up

This chapter introduces the concepts of global imbalances, the current account, the trade balance, and the NIIP, and documents how these variables have evolved over time in the United States and other countries.

- Worldwide, the distribution of external debts and credits is not even. Some countries, like the United States, are large net external debtors and some, like China, are large net external creditors. This pattern is known as global imbalances.
- The balance of payments keeps record of a country's international transactions.
- The balance of payments has two accounts, the current account and the financial account.
- The current account records transactions in goods, services, income, and unilateral transfers between residents and nonresidents.
- The financial account records transactions involving financial assets between residents and nonresidents.
- The current account has three components: the trade balance, the income balance, and net unilateral transfers.

- For most countries, including the United States, the trade balance is the largest component of the current account.
- In the United States, the trade balance and the current account move closely together over time.
- The United States has been running large current account deficits since the early 1980s.
- Current account deficits deteriorate a country's NIIP, which is the difference between a country's international asset position and its international liability position.
- Due to its large current account deficits, the United States turned from being a net external creditor in the early 1980s to being the world's largest net external debtor since the late 1990s.
- A second source of changes in a country's NIIP is valuation changes, originating from changes in exchange rates and in the price of the financial instruments that comprise a country's international asset and liability positions.
- In the United States, valuation changes became large in the early 2000s, reaching values as high as $\pm 15$ percent of GDP in a single year. Valuation changes were mostly positive between 2001 and 2010 and mostly negative between 2011 and 2020. On net, between 1976 and 2020, positive and negative valuation changes have roughly offset each other.
- The *NIIP—NII* paradox refers to the phenomenon that the United States has a negative net international investment position, $NIIP < 0$, and positive net investment income, $NII > 0$.
- Two stories that aim to explain the *NIIP—NII* paradox are the dark matter hypothesis and the rate-of-return differential hypothesis.
- The *NIIP—NII* paradox in the United States must have a flipped paradox in the rest of the world. China has had a positive *NIIP* and negative *NII* since the 2000s, so it displays the flipped *NIIP—NII* paradox.

## 1.9 Exercises

**Exercise 1.1 (TFU)** Indicate whether the following statements are true, false, or uncertain and explain why.

1. The trade balance, exports, and imports are all flow variables.
2. Net investment income (NII) is a stock variable.
3. The net international investment position of South Africa was \$−70.5 billion in 2010 and \$−19.7 billion \$ in 2011. The current account in 2011 was −10.1 billion USD. There must be an error in the official numbers. The correct figure should be a net international investment position of −80.6 billion USD in 2011.
4. The fact that the United States made large valuation gains between 2002 and 2007 means that the rest of the world as a whole made equally large valuation losses. After all, this is a zero-sum game.
5. The United States has large unrecorded foreign asset holdings.

6. According to the return differential hypothesis, China pays a higher rate of return on its international liabilities than on its international assets.
7. According to the dark matter hypothesis, the Chinese statistical agency overestimates the level of China's net international investment position (NIIP).

**Exercise 1.2 (Balance of Payments Accounting)** Describe how each of the following transactions affects the U.S. balance of payments. (Recall that each transaction gives rise to two entries in the balance of payments accounts.)

1. Jorge Ramírez, a landscape architect residing in Monterrey, Mexico, works for three months in Durham, North Carolina, creating an indoor garden for a newly built museum and receives wages of $35,000.
2. Jinill Park's mother, a resident of South Korea, pays her son's tuition to Columbia University via a direct deposit.
3. Columbia University buys several park benches from Spain and pays with a $120,000 check.
4. Floyd Townsend, of Tampa, Florida, buys $5,000 worth of British Airlines stock from Citibank New York, paying with U.S. dollars.
5. A French resident imports American blue jeans and pays with a check drawn on her account with J.P. Morgan Chase Bank in New York City.
6. An American company sells a subsidiary in the United States and with the proceeds buys a French company.
7. A group of American friends travels to Costa Rica and rents a vacation home for $2,500. They pay with a U.S. credit card.
8. The U.S. dollar depreciates by 10 percent vis-à-vis the euro.
9. The United States sends medicine, blankets, tents, and nonperishable food worth $400 million to victims of an earthquake in a foreign country.
10. Olga Rublev, a billionaire from Russia, enters the United States on an immigrant visa (that is, upon entering the United States she becomes a permanent resident of the United States). Her wealth in Russia is estimated to be about $2 billion.
11. The United States forgives debt of $500,000 to Nicaragua.

**Exercise 1.3** Find the most recent data on the U.S. current account and its components. Present your answer in a form similar to Table 1.1; that is, show figures in both current dollars and as a percentage of GDP. For current account and GDP data visit the BEA's website. Compare your table with Table 1.1.

**Exercise 1.4** Suppose Columbia University, a U.S. resident, acquires $100,000 worth of shares of Deutsche Telekom from a German resident. How does this transaction affect the U.S. balance of payments accounts and the U.S. NIIP in each of the following three scenarios. Be sure to list the entries in the U.S. current account and the U.S. financial account separately.

1. Columbia pays for the shares with U.S. dollar bills.
2. Columbia pays for the shares with an apartment it owns in midtown New York.

3. The German resident attends Columbia College and settles the tuition bill with the Deutsche Telekom shares.
4. Do all three scenarios have the same effects on the U.S. current account and on the U.S. NIIP?

**Exercise 1.5 (Bigger Debtor Nation)** On July 4, 1989, the New York Times reported, under the headline "U.S. is Bigger Debtor Nation," that *"The United States, already the world's largest debtor, sank an additional $154.2 billion into the red last year as foreign money poured in to plug the nation's balance-of-payments gap. .... The increasing debt is likely to mean that American living standards will rise a bit more slowly than they otherwise would, as interest and dividend payments to foreigners siphon off an increasing share of the United States' output of goods and services."* With the benefit of hindsight, critically evaluate the last statement.

**Exercise 1.6** This question is about the balance of payments of a country named Outland. The currency of Outland is the dollar.

1. Outland starts a given year with holdings of 100 shares of the German car company Volkswagen. These securities are denominated in euros. The rest of the world holds 200 units of dollar-denominated bonds issued by the Outlandian government. At the beginning of the year, the price of each Volkswagen share is €1 and the price of each unit of an Outlandian bond is $2. The exchange rate is $1.5 per euro. Compute the net international investment position (NIIP) of Outland at the beginning of the year.
2. During the year, Outland exports toys for $7 and imports shirts for €9. The dividend payments on the Volkswagen shares were €0.05 per share and the coupon payment on Outlandian bonds was $0.02 per bond. Residents of Outland received money from relatives living abroad for a total of €3 and the government of Outland gave $4 to a hospital in Guyana. Calculate the Outlandian trade balance, net investment income, and net unilateral transfers in that year. What was the current account in that year? What is the Outlandian NIIP at the end of the year?
3. Suppose that at the end of the year, Outland holds 110 Volkswagen shares. How many units of Outlandian government bonds are held in the rest of the world? Assume that during the year, all financial transactions were performed at beginning-of-year prices and exchange rates.
4. To answer this question, start with the international asset and liability positions calculated in item 3. Suppose that at the end of the year, the price of a Volkswagen share falls by 20 percent and the dollar appreciates by 10 percent. Calculate the end-of-year NIIP of Outland.

**Exercise 1.7 (Balance of Payments in a Two-Country World)** Suppose the world consists of two countries, country A and country C.

1. Let $NIIP^A$ denote the net foreign asset position of country A. Find the net foreign asset position of country C.
2. Let $CA^A$ denote the current account balance of country A. Find the current account balance of country C.

3. Let $A^A$ denote foreign assets owned by residents of country A and $L^A$ denote country A's assets owned by residents of country C. Find the foreign asset and liability positions of country C denoted $A^C$ and $L^C$, respectively.
4. Assume that the value of country A's foreign liabilities increases by 20 percent. Find the change in the net foreign asset position of country A and country C.

**Exercise 1.8 (*NIIP—NII* Paradox)** A country exhibits the paradoxical situation of having negative net investment income (*NII*) of $-100$ and a positive net international investment position (*NIIP*) of 1000. Economists' opinions about this are divided. Group A thinks that the explanation lies in the fact that, because of the bad reputation of the country in world financial markets, foreign investors charge a higher interest rate when they lend to this country, relative to the interest rate the country receives on its investments abroad. Group B believes that domestic investors inflate their gross international asset positions to look like big players in the world market.

1. Calculate the interest rate premium that would explain the paradox under group A's hypothesis, assuming that the interest rate on assets invested abroad is 5 percent and that the country's gross international asset position is 4000.
2. Calculate the amount by which domestic investors inflate their gross foreign asset positions under group B's hypothesis, assuming that the interest rate on assets and liabilities is 5 percent.

**Exercise 1.9 (NIIP and NII in a Two-Country World)** The international asset position of country 1, denoted $A$, consists of \$10 in bonds issued by the government of country 2, and \$20 in shares of firms residing in country 2. The international liabilities of country 1, denoted $L$, consist of \$35 in bonds issued by the government of country 1 and held by foreign residents, and \$5 in shares of firms residing in country 1 held by foreigners. Suppose that the rate of return on government bonds is 2 percent and that the rate of return on shares is 6 percent.

1. Calculate the net international investment position (NIIP) and net investment income (NII) in country 1.
2. Suppose you observe the NIIP and NII of country 1 (refer to the numbers you obtained in question 1), but not the rate of return on bonds and shares. Suppose further that your explanation for the observed values of NIIP and NII is dark matter. Assuming a rate of return of 3 percent on all assets, how big is dark matter and what is the "true" net international investment position, TNIIP, in country 1?

**Exercise 1.10 (NIIP and NII in a Three-Country World)** The international asset and liability positions of countries 1, 2, and 3 are as follows:

Country 1:
- International Asset Position ($A^1$)
  \$50 in shares of firms residing in country 2, and \$50 in shares of firms residing in country 3.

- International Liability Position ($L^1$)
  \$200 in bonds issued by country 1 and held by foreign residents.

Country 2:
- International Asset Position ($A^2$)
  \$100 in bonds issued by the government of country 1.
- International Liability Position ($L^2$)
  \$75 in shares of firms residing in country 2 and held by foreign residents.

Country 3:
- International Asset Position ($A^3$)
  \$100 in bonds issued by the government of country 1, and \$25 in shares of firms residing in country 2.
- International Liability Position ($L^3$)
  \$50 in shares of firms residing in country 3 and held by foreign residents.

Suppose that the rate of return of bonds issued by the government of country 1 is $r^1 = 1$ percent, that the rate of return on shares of firms residing in country 2 is $r^2 = 2$ percent, and that the rate of return on shares of firms residing in country 3 is $r^3 = 3$ percent.

1. Calculate the net international investment positions of countries 1, 2, and 3, denoted $NIIP^1$, $NIIP^2$, and $NIIP^3$, respectively.
2. Calculate the net investment income of countries 1, 2, and 3, denoted $NII^1$, $NII^2$, and $NII^3$, respectively.
3. Suppose an analyst only observes the pairs $(NIIP^i, NII^i)$, for $i = 1, 2, 3$. What would she most likely find paradoxical about them? Knowing all of the data, how would you explain those apparent paradoxes?
4. Take the country with a negative NIIP and positive NII. What would a believer in dark matter say is the true NIIP, denoted TNIIP? What would she say is dark matter? Suppose that in her calculations, this analyst uses the average rate of return across all securities; that is, $(r^1 + r^2 + r^3)/3$.

**Exercise 1.11 (Valuation Changes)** Suppose that over the period 2020 to 2022, the net international investment position of a country was $NIIP_{2020} = 100$, $NIIP_{2021} = 125$, and $NIIP_{2022} = 130$. Suppose that over the same period, the current account was $CA_{2020} = 30$, $CA_{2021} = 20$, and $CA_{2022} = 10$. Calculate valuation changes in 2021 and 2022.

**Exercise 1.12 (Dark Matter versus Return Differentials I)** Suppose net investment income is $NII = 200$, the international asset position is $A = 3000$, the international liability position is $L = 4000$, and the rate of return is 5 percent, $r = 0.05$.

1. Economist John Green, a strong advocate of the dark matter hypothesis, believes that $A$ is not accurately recorded. Calculate the amount of dark matter and the "true" international asset position, which we will denote $TA$, consistent with Green's view.
2. Financial analyst Nadia Gonzalez does not believe in the dark matter hypothesis. Instead, she believes that $A$ is accurately measured. In her view

5 percent is actually the rate of return on assets $r^A = 0.05$, and the rate of return on the country's international liabilities, $r^L$, is different. Find the value of $r^L$ consistent with Gonzalez's view.

**Exercise 1.13 (Dark Matter versus Return Differentials II)** Suppose net investment income is $NII = 300$, the net international investment position is $NIIP = -2000$, the international liability position is $L = 5000$, and the rate of return on assets is 4 percent ($r^A = 0.04$).

1. Economic consultant Jim Taylor, a strong advocate of the return differential hypothesis, maintains that the rate of return on the country's international liabilities, denoted $r^L$, is different from the return on its net international assets. Find the value of $r^L$ consistent with Taylor's view.
2. Economist Teresa Jones does not support the idea of return differentials. Instead, she defends the dark matter hypothesis. Specifically, she believes that $A$ is not accurately recorded and that the rate of return is 4 percent on both, $A$ and $L$. Calculate the amount of dark matter and the "true" international asset position, which we will denote $TA$, consistent with Jones's view.

**Exercise 1.14 (Net Foreign Asset Positions around the World)** Download data on current accounts and net foreign asset positions from the External Wealth of Nations Database put together by Philip Lane and Gian Maria Milesi-Ferretti. For each country that has current account and net foreign asset position data starting in 1980, sum the current account balances from 1980 to the latest date available and find the change in the NIIP over the corresponding period. Then plot the change in the net foreign asset position against the cumulated current account balances. Discuss your results. In particular, comment on whether cumulative current account balances represent a good measure of global imbalances (refer to Figure 1.1). What does your graph suggest, if anything, about the quantitative importance of valuation changes for the majority of countries in your sample?

**Exercise 1.15** Section 1.6 analyzes how valuation changes affected the *NIIP* of the United States over the past decades. In this question, you are asked to analyze how valuation changes affected the *NIIP* of China.

1. Download data on China's current account, net foreign asset position, and gross domestic product from the External Wealth of Nations Database put together by Philip Lane and Gian Maria Milesi-Ferretti. Use these time series to construct the hypothetical *NIIP* of China and then, using a software like Matlab or Excel, plot the actual *NIIP* and the hypothetical *NIIP* for China, both expressed in terms of GDP. Your plot should be a version of Figure 1.8 but using Chinese instead of U.S. data. Compare and contrast your findings to those obtained for the United States.
2. Then construct a time series for valuation changes in China's net foreign asset position. Plot valuation changes as a share of GDP. Use the same scale for the vertical axis as that of Figure 1.6. Then compare and contrast the

valuation changes experienced by China with those experienced by the United States. What may account for the observed differences?

**Exercise 1.16 (Dark Matter over Time)** Use data from the BEA to construct a time series of dark matter using the methodology explained in subsection 1.7.1. Construct a time series as long as the available data permits. Discuss the plausibility of the dark matter hypothesis based not on its size, but on its volatility over time.

**Exercise 1.17 (The Effects of the 2017 Tax Cuts and Jobs Act (TCJA) on Components of the International Transactions Accounts)**

1. Read "Apple, Capitalizing on New Tax Law, Plans to Bring Billions in Cash Back to U.S.," which appeared online in the New York Times on January 17, 2018. We will use this article to learn what the TCJA is about and to see if we can follow the algebra given in the article.
   (a) Based on the information given in the article, how much corporate cash held abroad is Apple repatriating?
   (b) What is the tax saving from the repatriation under the new one-time lower tax relative to the pre-reform tax rate?
   (c) What is the potential maximum tax saving for Apple from the repatriation under the new one-time lower tax rate relative to the post-reform tax rate of foreign corporate cash holdings? That is, how high is the incentive to repatriate the cash, taking as given that the tax law changed?
   (d) The article states that "By shifting the money under the new terms, Apple has saved $43 billion in taxes." Given the information provided in the article, do you agree or disagree with this figure?
2. Assume that Apple Ireland is owned by Apple USA and that 2018 earnings of Apple Ireland are 0. Assume that nevertheless Apple Ireland paid Apple USA cash dividends in the amount of $100 billion. Read the short BEA FAQ article "How are the International Transactions affected by an increase in direct investment dividend receipts," June 20, 2018, available at https://www.bea.gov/help/faq/166 and then answer the following questions.
   (a) How will this cash repatriation enter the U.S. current account?
   (b) How will this cash repatriation enter the U.S. financial account?
   (c) Finally, discuss whether the repatriation of earnings of foreign subsidiaries of U.S. companies will or will not improve the U.S. current account deficit.